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SOME SPECIES AND VARIETIES OF ELYMUS IN EASTERN NORTH AMERICA.

K. M. WIEGAND.

THE genus *Elymus* has long been a problem to students of grasses. The older treatments were wholly inadequate, since several of the common species were formerly unrecognized. During recent years Scribner and others have described several additional species from eastern North America, but no comprehensive treatment of the genus was given by these writers. In 1908 Hitchcock contributed the article on *Elymus* to the seventh edition of Gray's Manual, but this treatment seems not to have cleared the situation to any appreciable extent; and the same statement may be made in reference to the treatment of the genus by Nash in the second edition of Britton and Brown's Illustrated Flora in 1913. During the course of studies upon the plants of central New York, the writer became interested in *Elymus*. The present article is the result of this study. It was begun in the herbarium of the College of Agriculture at Cornell University; but later, through the courtesy of those in charge of the Gray Herbarium, the work was continued and completed at that institution. The revision is herewith presented with the hope that it may contribute toward a clearer understanding of the genus.

In many instances it will be noted that the characters used in the key are not those ordinarily employed to separate species of *Elymus*. To the writer these here used seem more essential, and seem to separate the species more naturally. During the study a very great many measurements were made of all parts of the plant, and a surprising constancy in size, within certain limits was noted in each species and

variety. It was found impracticable to indicate the length of the body of the glume or lemma because of the gradual transition into the awn. In the text all measurements in length of these two organs include the awn. A much better and more definite indication of the size of the floret is found in the palet, the apex of which is easily recognizable. The degree of pubescence of both the florets and the foliage varies widely in nearly every species, yet in some cases it seems to indicate a more or less definite varietal or even specific difference. The breadth, induration and form of the glumes have long been used in distinguishing the species, and in our study also prove of great value. There is, however, much variation of these organs in *E. virginicus* and *E. robustus*.

Much of the previous difficulty in *Elymus* was due to the failure to recognize the species here described as new. This has for years formed a large portion of the material passing as *E. canadensis*. Further confusion has arisen through the failure to differentiate between *E. canadensis* and *E. robustus* along what now seem to be the proper specific lines. The present paper deals only with *E. virginicus*, *E. canadensis* and their immediate allies. These form a rather natural group, from which *E. arenarius*, *E. glaucus*, and other species may be excluded.

SYNOPSIS AND KEY TO THE SPECIES TREATED.

- a. Awns straight (when mature and dry): palet 5.2-8 (rarely 8.5-9.2 in *E. virginicus*) mm. long b.
- b. Glumes broad (0.9-2 mm. wide), strongly indurated and more or less curved at the base c.
- c. Glumes 1-2.7 cm. long: lemmas 1-3 cm. long d.
- d. Glumes and lemmas more or less awned e.
- e. Lemmas and glumes glabrous or merely scabrous on the margins f.
- f. Leaves flat: spikes usually included at the base... *E. virginicus*.
- f. Leaves involute when dry, narrower: spikes mostly exserted: plant lower... *E. virgin.*, var. *halophilus*.
- e. Lemmas and glumes villous-hirsute... *E. virgin.*, var. *hirsutiglumis*.
- d. Glumes and lemmas awnless or nearly so
E. virgin., var. *submuticus*.
- c. Glumes 2.7-4 cm. long: lemmas (2.8-) 3.5-4.5 cm. long: spikes exserted g.
- g. Glumes and lemmas villous-hirsute... *E. australis*.
- g. Glumes and lemmas strigose-scabrous or glabrous.
E. aust., var. *glabriflorus*.
- b. Glumes narrow, often setiform (0.4-0.8 mm. wide), indurated and terete below, essentially straight h.
- h. Palet 7.5-8 mm. long: rachis-joints 3-4.5 (rarely 5-8) mm. long: spikelets 2-4-flowered: leaves and sheaths glabrous... *E. riparius*.

- h. Palet 5.2–6.7 mm. long: rachis-joints 1.5–3 mm. long: spikelets 1 (rarely 2)-flowered: foliage villous *i*.
- i. Lemmas and glumes villous-hirsute.....*E. striatus*.
- i. Lemmas and glumes glabrous or slightly strigose
E. stri., var. *arkansanus*.
- a. Awns curved outward toward apex (when mature and dry): palet 9–11(–15) mm. long (occasionally 8 mm. in *E. diversiglumis*) *j*.
- j. Leaves rather thin, usually somewhat villous above: spike slender and rather loose: glumes 2–25(–35) mm. long *k*.
- k. Glumes 2–15 mm. long, setiform: spikelets 2–3-flowered: leaves 6–12 mm. wide: lemmas villous-hirsute.....*E. diversiglumis*.
- k. Glumes 15–20 (rarely 8–27) mm. long, rather narrow but not setiform, flat above: spikelets 4–7-flowered: leaves 13–20 mm. wide.....*E. canadensis*.
- j. Leaves firm, 5–15 mm. wide, tending to be involute when dry, usually glabrous: spike somewhat denser: spikelets 2–5(usually 3–4)-flowered: glumes 20–25 (rarely 15–35) mm. long, usually broader and flatter *l*.
- l. Lemmas glabrous or sparsely hispidulous.....*E. robustus*.
- l. Lemmas villous-hirsute.....*E. robust.*, var. *vestitus*.

E. VIRGINICUS L. Sp. Pl. 84 (1753). *E. carolinianus* Walter, Fl. Carolin. 82 (1788). *E. nitidus* Vasey, probably, Bull. Torr. Bot. Club, xiii. 120 (1886). *E. virginicus*, var. *minor* Vasey, small form, Contr. U. S. Nat. Herb. ii. 550 (1891). *E. virginicus*, forma *jejuna* Ramaley, small form, Bull. Geol. and Nat. Hist. Survey Minn. ix. 114 (1894). *E. jejuna* Rydberg, Bull. Torr. Bot. Club, xxxvi. 539 (1909).—Leaves rather narrow, 1.2 cm. wide or less, thin, glabrous or somewhat villous above, green or slightly glaucous; upper sheaths much inflated: spikes rather narrow, straight, included at base or short-exserted; rachis-joints about 5 mm. long: spikelets 2–4-flowered, appressed or somewhat spreading: glumes broad (1.5–2 mm.) and very short-awned (1.4–2.7 cm. long), strongly indurated and curved at the yellowish and usually unstriated subterete base: lemmas 1.8–3 cm. long, glabrous; awn short and straight: palet 6.5–8 (rarely 8.5–9.2) mm. long: grain 5–6 mm. long.—Alluvial bottomlands and stream-banks: Newfoundland and Quebec to District of Columbia, westward to Montana and Colorado, and southward in the central states to Louisiana and Texas.

Var. **halophilus** (Bicknell), n. comb. *E. halophilus* Bicknell, Bull. Torr. Bot. Club, xxxv, 201 (1908).—Differs from the typical form in the lower stature, narrower and involute leaves which are often more glaucous, narrower upper sheaths, and more uniformly exserted short spikes (glumes 12–17 mm. long; lemmas 1.2–2.2 mm. long; palet 6–8 mm. long).—Brackish marshes and sand along the coast: Washington County, Maine, to Long Island.

Var. **HIRSUTIGLUMIS** (Scribner) Hitchcock, RHODORA, x. 65 (1908). *E. hirsutiglumis* Scribn. Bull. Div. Agrost. 11, p. 58 (1898). *E. intermedius* Scribner & J. G. Smith, Bull. Div. Agrost. 4, p. 38 (1891).—Differs from the typical form in the villous-hirsute lemmas and

glumes.—Coast of Maine to Pennsylvania and westward to Nebraska and Missouri.

Var. *SUBMUTICUS* Hooker, Flor. Bor.-Am. ii. 255 (1840). ?*E. curvatus* Piper, Bull. Torr. Bot. Club, xxx. 233 (1903).—Differs from the typical form in the almost complete absence of awns on both glumes and lemmas.—Dartmouth River, Gaspé County, Quebec, and the coast of Massachusetts, and from Illinois to Saskatchewan, Nebraska, Kansas and Oklahoma, also in Washington (*Piper*).

Specimens of *E. virginicus* from central Maine (Penobscot Valley) have unusually large and coarse spikes and large spikelets with the palet 8.5–9.2 mm. long. *E. halophilus* is here maintained as a variety as it differs from the typical form only in minor and variable characters. Many specimens along the coast are transitional in width of leaf, degree of involucre, and length of spike.

E. AUSTRALIS Scribner & Ball, Bull. Div. Agrost. 24, p. 46 (1901).—Leaves 12 mm. wide or less, thin, sparingly villous above, rarely glabrous, green or slightly glaucous; upper sheaths scarcely inflated: spikes more or less exserted, straight, 8–14 cm. long; joints of the rachis 3–6 mm. long: spikelets usually slightly spreading, 2–4-flowered: glumes elongated, of medium breadth (2.7–4 cm. long, 0.9–1.1 mm. wide), thick and indurated toward the curved, usually unstriated, yellowish base, villous-hirsute: lemmas 3.5–4.5 cm. long, villous-hirsute; awn long and straight: palet 7–8 mm. long: grain 5 mm. long.—Swampy woods and stream-banks, rarely in drier situations, along the coast from eastern Massachusetts to Georgia; and also in Missouri and Nebraska. The Missouri labels seem to indicate drier situations.

Var. *glabriflorus* (Vasey), n. comb. *E. canadensis*, var. *glabriflorus* Vasey, Contr. U. S. Nat. Herb. ii. 550 (1894). *E. glabriflorus* Scribner & Ball, Bull. Div. Agrost. 24, p. 49 (1901).—Differs from the typical form in the glabrous or merely strigose-scabrous glumes and lemmas; the former slightly broader (1.1–1.8 mm. wide). Dry banks and woods: Ayer, Massachusetts (*Manning*); and from Maryland to Florida, westward through Tennessee and Illinois to Nebraska and Texas.

E. australis is a near relative of *E. virginicus* from which it differs only in the longer awns, more regularly exserted spikes and more generally villous leaves. The differences are, however, sufficiently constant and obvious to warrant its retention as a valid species.

E. riparius, sp. nov., procerus; foliis 7–25 mm. latis tenuibus viridibus vel leviter glaucescentibus glabris, vaginis strictis glabris; spicis multum exsertis parum nutantibus 7–20 cm. longis (aristis exceptis); spiculis 2–4-floris subpatentibus, segmentis racheos 3–4.5 raro 5–8 mm. longis, glumis scabris angustissimis (0.4–0.8 mm. latis, 1.8–3 cm. longis) basi tereti indurata flavescente non striata recta,

lemmatibus (2.2–)3–4.5 cm. longis subtiliter et tenuiter hispidulosis, aristis magnis rectis, palea 7.5–8 mm. longa, caryopsibus 5–6 mm. longis.

Plant tall: leaves 7–25 mm. broad, thin, green or slightly glaucous, glabrous; sheaths close, smooth: spikes much exserted, slightly nodding, 7–20 cm. long, exclusive of the awns: spikelets 2–4-flowered, somewhat spreading; joints of the rachis 3–4.5 rarely 5–8 mm. long: glumes very slender (0.4–0.8 mm. wide, 1.8–3 cm. long), terete, and indurated toward the nonstriate, yellowish, straight base; lemmas (2.2–)3–4.5 cm. long, minutely and sparsely hispidulous; awns long and straight: palea 7.5–8 mm. long: grain 5–6 mm. long.— Along stream-margins and in alluvial bottomlands: central Maine, through New Hampshire and Vermont to western Massachusetts, northern Connecticut, westward to western New York, and southward to the mountains of Virginia, West Virginia and Kentucky. The Rhode Island and the Delaware specimens listed below seem out of the normal range. MAINE: Franklin County: river-bank, Farmington, *C. H. Knowlton*. Kennebec County: alluvial river-thickets, Sidney, August 18, 1916, *Fernald & Long*, no. 12747; dry open clay river-terraces, Sidney, August 18, 1916, *Fernald & Long*, no. 12746. Oxford County: Buckfield, 1895, *J. C. Parlin*. NEW HAMPSHIRE: Carroll County: banks of Saco River, North Conway, August 30, 1855, *Wm. Boott*. Grafton County: railroad yards, Woodsville, August 8, 1908, *E. F. Williams*. Cheshire County: alluvial thickets, Alstead, August 2, 1900, *Fernald*, no. 373. VERMONT: Orleans County: Willoughby Garden, Willoughby, August 1, 1894, *E. F. Williams*; North Slide, Willoughby Mountain, August 15, 1896, *E. & C. E. Faxon*. Caledonia County: St. Johnsbury Center, August 17, 1874, *J. W. Congdon*. Addison County: White River Valley, Hancock, July 18, 1908, *E. F. Williams*. Windham County: shore of West River, Townsend, August 26, 1911, August 7, 1913, *L. A. Wheeler*, no. 15; riverbanks, Brattleboro, August 2, 1898, *B. L. Robinson*, no. 85. MASSACHUSETTS: Essex County: Merrimac River banks near the "Deer leap," Andover, September 19, 1903, *A. S. Pease*. Franklin County: banks of North River, Griswoldville, Coleraine, August 4, 1909, *E. F. Williams*; wet roadside, Conway, August 6, 1909, *E. F. Williams*. Hampshire County: Huntington, August 17, 1912, *B. L. Robinson*, no. 755. Hampden County: Westfield, August 12, 1901, *M. A. Day*, no. 55. Berkshire County: Williamstown, July 28, 1898, *J. R. Churchill*; Stockbridge, August 23, 1902, *R. Hoffmann*; Pittsfield, September 23, 1899, *R. Hoffmann*. RHODE ISLAND: Providence County: border of Pawtuxet River, Cranston, August 4, 1911, *Thos. Hope*. CONNECTICUT: Hartford County: East Granby, August 4, 1901, *A. W. Driggs*; river-banks, Southington, August 17, 1895, *C. H. Bissell*, no. 753. Litchfield County: alluvium of the Housatonic, Canaan, September 6, 1909, *Fernald*. NEW YORK: St. Lawrence County: roadside, Pitcairn, August 1, 1914, *O. P. Phelps*, no. 132.

Orange County: August 11, 1889, *G. V. Nash*. Tompkins County: in dry woods, Six Mile Creek, Ithaca, July 29, 1913, *E. L. Palmer*, no. 167; near Beech Woods, Six Mile Creek, July 29, 1914, *F. P. Metcalf*, no. 1744; damp thickets, Violet Island, Cascadilla Creek, Ithaca, August 18, 1913, *E. L. Palmer*, no. 168; dry woods along lower state road, Cayuga Heights, Ithaca, July 18, 1916, *F. P. Metcalf*, no. 5874; damp alluvial thickets, Fall Creek, Forest Home, Ithaca, August, 1916, *F. P. Metcalf*, nos. 5868, 5869; bottomland woods and thickets in alluvial soil at head of Cayuga Lake, Ithaca, August, 1915, *A. J. Eames*, no. 3566, and *Eames & MacDaniels*, no. 3567 (TYPE in Gray Herb.), August, 1916, *F. P. Metcalf*, nos. 5866, 5867, 5870. DELAWARE: New Castle County: Wilmington, *E. Tatnall*. VIRGINIA: Page County: Stony Man Mountain and vicinity, near Luray, alt. 3800 ft., August 28, 1901, *E. S. & Mrs. Steele*, no. 189. Smyth County: Middle fork of Holston River, Marion, alt. 2100 ft., August 6, 1892, *J. K. Small*. WEST VIRGINIA: Monroe County: Sweet Springs, alt. 550 ft., *E. S. & Mrs. Steele*, no. 218. Pocohontas County: gravelly soil by East fork of the Greenbrier River, near village of Travellers Repose, September 19, 1904, *A. H. Moore*, no. 2345; same, *J. M. Greenman*, no. 89. Tucker County: banks of Blackwater River near Hendricks, September 10, 1904, *J. M. Greenman*, no. 56. KENTUCKY: Harlan County: Big Black Mountain, August, 1893, *T. H. Kearney Jr.*, no. 236.

This plant in aspect resembles *E. canadensis*, *E. striatus* and *E. australis*. In the herbaria it has passed under all three names. Its characters are, however, distinct and constant, and it is really one of the most distinct of the species here treated. It differs from *E. canadensis* and *E. robustus* in the more spreading spikelets, straight awns, longer and more slender glumes, uniformly hispidulous lemmas, and shorter palet. From *E. striatus* it may be recognized by the coarser habit, glabrous foliage, longer rachis-joints, scabrous lemmas, and longer palet. From *E. australis* and its variety *glabriflorus* it is told by the glabrous leaves, slender straight glumes, and usually longer more open spikes. *E. riparius* is very common in central New York.

E. STRIATUS Willd., Sp. Pl. i. 470 (1797). *E. villosus* Muhl. in Willd. Enum. Hort. Berol. 131 (1809). *E. striatus*, var. *villosus* Gray, Manual, ed. 5, 639 (1867). *E. striatus*, var. *Ballii* Pammel, Ia. Geol. Surv. Suppl. Rep. 1903, 347 (1904).— Plant slender: leaves thin, 6–10 mm. wide, green, villous on the upper surface; sheaths close, villous: spikes rather short, 4–9 cm. long exclusive of awns, slightly nodding, long-exserted; rachis-joints very short, 1.5–2.5 (–3) mm. long; spikelets small, 1- rarely 2-flowered, spreading: glumes very narrow, 0.4–0.6 mm. wide, 1.4–3 cm. long, terete and indurated toward the unstriated yellowish base, straight, villous:

lemmas villous, 2.3–5 cm. long; awn long and straight: palet short, 5.2–6.7 mm. long: grain 3 mm. long.—Rocky woodlands and dry thickets: Vermont and eastern Massachusetts to Delaware, and the mountains of North Carolina, westward to Wisconsin, Nebraska, Kansas, and Oklahoma.

Var. *ARKANSANA* (Scribn. & Ball) Hitchc., *RHODORA*, viii. 212 (1906). *E. arkansana* Scribner & Ball, Bull. Div. Agrost. 24, p. 45 (1901).—Differs from the typical form in the almost or completely glabrous glumes and lemmas.—Iowa, Missouri, and Arkansas, according to Scribner and Ball. The writer has seen specimens from Nebraska and Virginia (Bedford County, *A. H. Curtis*, July 1871); also doubtful ones from Illinois (Stark County, *V. H. Chase*, no. 45).

E. DIVERSIGLUMIS Scribner & Ball, Bull. Div. Agrost. 24, p. 48 (1901).—Plant of medium height, more or less glaucous: leaves thin, narrower than in the next, 6–12 mm. wide, more or less villous above: spikes much exserted, long, flexuous, nodding and slender (10–20 cm. long); rachis-joints 5–8 mm. long: spikelets mostly appressed, 2- rarely 3-flowered: glumes very short and subulate or acicular, unequal, straight (2–15 mm. long), scabrous or smooth, yellowish and indurated below: lemmas villous-hirsute, 2–4 cm. long; the slender awns much curved when dry; palet 8.5–9 mm. long.—Wisconsin, Minnesota, North Dakota, and Wyoming.

This plant seems to be limited to the northern Great Plains region, and the few specimens at hand would indicate that it is scarce. There is in the Gray Herbarium a specimen which from the label would seem to be a portion of the type material of Buckley's *E. interruptus*. At first glance this is difficult to distinguish from *E. diversiglumis*, but the glumes are somewhat longer and the lemmas are glabrous. It was matched by no other material at hand.

E. CANADENSIS L., Sp. Pl. 83 (1753). *E. philadelphicus* L. Amoen. Acad. iv. 266 (1759). *E. glaucifolius* Muhl. in Willd. Enum. Hort. Berol. 131 (1809). *E. Canadensis*, var. *glaucifolius* Torr. Fl. U. S. i. 137 (1824).—Plant tall and more or less glaucous: leaves thin and broad, the larger 1.3–2 cm. wide, not involuting, villous above, rarely nearly glabrous: spikes exserted, rather loose and long (10–30 cm. in length), flexuous and nodding; rachis-joints 5–8 mm. long: spikelets slightly spreading, 15–25 mm. long, (3–)4–7-flowered: glumes shorter than in the next (2–27, usually 15–20 mm. long), flat but rather narrow, slightly indurated at base, straight, glabrous, scabrous or hispidulous, tapering to the short awn: lemmas villous-hirsute, rarely almost glabrous, 3.5–4.5 cm. long; awns long and curved when mature and dry: palet 9–15 mm. long: grain 7–8 mm. long.—Alluvial or sandy riverbanks: Gaspé County, Quebec, to the interior of Maine, New Hampshire, Vermont, western Massachusetts, northern Connecti-

cut, and northern and central New York. QUEBEC: Gaspé County: alluvial thickets and woods near mouth of Dartmouth River, August, 1904, *Collins, Fernald, & Pease*. Wright County: Pickanock River, August, 1894, *J. Macoun*, no. 7421. MAINE: Aroostook County: Fort Fairfield, 1881, *K. Furbish*; low gravelly thickets along St. John River, St. Francis, August, 1893, *Fernald*, no. 197; and July, 1900, *E. F. Williams*. Piscataquis County: gravelly shore, Dover, September, 1894, *Fernald*; banks of Pleasant River, Milo, August, 1904, *J. C. Parlin*, no. 1793. Somerset County: sandy river-banks and river-intervales, Dead River, August, 1896, *Fernald & Strong*, no. 490. Oxford County: Rumford, 1889, *J. C. Parlin*; thicket on river-bank, Canton, August, 1906, *J. C. Parlin*, no. 2038. Kennebec County: river thickets, Sydney, August 1916, *Fernald & Long*, no. 12748. NEW HAMPSHIRE: Coos County: Jefferson, August, 1874, *Wm. Boott*; damp roadside near Bois Mountain Station, Jefferson, August, 1907, *A. S. Pease*, no. 10010 $\frac{1}{2}$; alluvial bank of Israel River, Lancaster, August, 1909, *A. S. Pease*, no. 12289; gorge of Diamond River, Dartmouth College Grant, August, 1914, *A. S. Pease*, no. 16282; river-bank, Northumberland, July, 1909, *A. S. Pease*, no. 12127; "Lost Nation," Northumberland, July, 1906, *E. F. Williams*. VERMONT: Caledonia County: St. Johnsbury Center, August, 1874, *J. W. Congdon*. Windham County: moist thickets along West River, Townshend, August 11, 1911, *L. A. Wheeler*. MASSACHUSETTS: Hampden County: sandy river-bank, sericite schist, Russell, May, 1913, *St. John & White*, no. 30; river-thicket, Westfield, September, 1912, *C. H. Knowlton*. Berkshire County: Williamstown, September, 1897, and July, 1898, *J. R. Churchill*; flood plain, Stockbridge, August, 1902, *R. Hoffmann*. CONNECTICUT: Hartford County: bank of river, East Windsor, August, 1902, *C. H. Bissell*. Litchfield County: dry shaded sandy bank of the Naugatuck River, Reynolds Bridge, September 3, 1910, *A. E. Blewitt*. New Haven County: dry sandy woods, banks of Naugatuck River, Waterbury, "very glaucous all over," July, 1908, *A. E. Blewitt*, no. 35; in sandy thicket, Waterbury, September, 1911, *A. E. Blewitt*. NEW YORK: St. Lawrence County: Little River, Canton, August, 1914, *O. P. Phelps*, no. 134. Madison County: Oneida, August, 1906, *H. D. House*, no. 2860.

This species differs from the next in the broad thin villous leaves, longer spikelets with more flowers, shorter glumes and usually in the more slender and open spike. There is some evidence that it matures earlier. *E. canadensis* is a plant of the inland waterways of the Northeast, in situations which are not extremely dry; while *E. robustus* inhabits dry sandy or rocky banks and sand dunes, and has a more southerly and westerly distribution. The striations upon the glumes in both *E. canadensis* and *E. robustus* extend more nearly to the base than in any other species. Specimens of *E. robustus* with

very dense spikes will usually be found to be just in flower. Before maturity the spikes elongate somewhat.

The Linnean type of *E. canadensis* has been discussed by Hitchcock, Contr. U. S. Nat. Herb. xii. 123 (1908). It is there shown that the types of *E. canadensis* and of *E. philadelphicus* were essentially the same, and were a plant with very broad leaves and loose nodding spikes. In his description Linnaeus states that the leaves were very broad, and the spikelets six-flowered. Considering these statements and the fact that the plant came from Canada (*Kalm*) there is little doubt whether this or the next species is the real *E. canadensis*. In the original description of *E. glaucifolius* it also is said to have broad leaves and six-flowered spikelets, and is therefore presumably the same plant, although it came from Pennsylvania from which state we have seen no specimens of *E. canadensis*. However this species is to be expected in the mountains of Pennsylvania. In describing *E. glaucifolius* it was quite possibly contrasted as to glaucescence with *E. riparius* which is scarcely glaucous but which has frequently been mistaken for *E. canadensis*.

E. ROBUSTUS Scribner & J. G. Smith, Bull Div. Agrost. 4, p. 37 (1897). *E. brachystachys* Scribn. & Ball, Bull. Div. Agrost. 24, p. 47, (1901).—Plant low or rather tall, more or less glaucous: leaves firm, with a strong involuting tendency, 5–15 mm. wide, usually entirely glabrous: spikes long-exserted, large (8–20, rarely 25 cm. long), usually rather dense and stiff, upright and but slightly nodding; rachis-joints 4–7 mm. long: spikelets slightly spreading or subappressed, 2–5-, mostly 3–4-flowered, 13–17 mm. long: glumes 15–35, mostly 20–25 mm. long, broad or rather narrow (0.5–2 mm. wide), flat and thin above, flattish or slightly indurated at base, glabrous or nearly so, margins scabrous: lemmas glabrous or sparsely hispidulous, 2.8–5 cm. long; the long slender awn somewhat curved and flexuous when mature and dry: palea 9–11 mm. long, rarely in small plants 8.5 mm. long: grain 6–8 mm. long.—Dry sandy, gravelly or rocky soil: southern Grafton County, New Hampshire, to Windham County, Vermont, eastern Massachusetts and Connecticut; also from Illinois and Michigan to Montana, Colorado, Texas, and New Mexico.

The type material of *E. robustus* (*Pammel*, Iowa), of which a portion from the same distribution is in the Gray Herbarium, has the lemmas entirely glabrous, though the species as originally described included also the var. *vestitus*. The writer has been unable to detect any real difference between *E. brachystachys* Scribn. & Ball and *E. robustus*. Even the alleged difference in length of spike is scarcely apparent.

Var. **vestitus**, var. nov., a forma typica differt lemmatibus villosi-hirsutis.

Differs from the typical form in the villous-hirsute lemmas.— Apparently very common: New Brunswick (introduced) and Maine (introduced) to Delaware, westward to Oregon, southward in the Mississippi Valley to Missouri, and southwest to Arizona. TYPE (in Herb. N. Y. State Col. Agric., Ithaca): dry ground, Cedar Point, Erie County, Ohio, July 17, 1914, *L. H. MacDaniels*, no. 106.

The *E. canadensis*, forma *crescendus* Ramaley, Bull. Geol. & Nat. Hist. Survey Minn. 9, p. 114 (1894) and the *E. crescendus* Wheeler, Minn. Bot. Stud. iii. 106 (1903) were probably based on material which is here included in the variety *vestitus*, but since they were based on size, not on pubescence of the lemmas, and since the name has not been used as a varietal name, it seems best not to take up one so inappropriate for our present variety. Certain specimens from Minnesota and the Dakotas have hairy leaves and sheaths, and may be the *E. canadensis* var. *villosus* Bates, Amer. Botanist, xx. 17, (1914). In some of the specimens from the Northwest the glumes are unusually narrow.

CORNELL UNIVERSITY.

ROSA BLANDA AND ITS ALLIES OF NORTHERN MAINE AND ADJACENT CANADA.

M. L. FERNALD.

THE region of Silurian, Cambrian and Lower Carboniferous limestones and calcareous slates and sandstones extending from northern Maine to the St. Lawrence and across northern New Brunswick to the Gaspé Peninsula and Anticosti is strongly differentiated from the coastwise district of southern Maine, southeastern New Brunswick, and Nova Scotia, where the soils are chiefly derived from acid or at most only slightly calcareous rocks. Hundreds of species are known from the St. John Valley in Maine and New Brunswick and from Rimouski Co., Quebec, to Gaspé and Anticosti which are quite absent from the acid soils to the south and southeast; and almost every group of plants, when critically studied, furnishes striking cases of this differentiation.